USN | | | | | | | | | | | | **15EE36**

Third Semester B.E. Degree Examination, Dec.2017/Jan.2018
Electrical and Electronic Measurements

Time: 3 hrs. Max. Marks: 80

**Note: 1. Answer any FIVE full questions, choosing
ONE full question from each module.
2. All symbols and anonyms have their usual meaning.**

Module-1

1 a. Derive the dimensions of the following quantities with mass, length, time and current as the fundamental units :
   i) Inductance   ii) Capacitance   iii) Electric Flux   iv) Resistance v) Resistivity. **(06 Marks)**
   b. Illustrate with neat sketch, Kelvin double bridge to measure the internal resistance of an ammeter accurately. **(06 Marks)**
   c. The Thevenin's equivalent voltage of a Wheatstone bridge is 25mV and the galvanometer current is 20µA. The resistance of the galvanometer is 50Ω. The ratio arms have resistances of 1000Ω and 5000Ω respectively. Find the value of the standard resistance for which the above conditions are satisfied. The value of the resistance to be measured is 600Ω. **(04 Marks)**

OR

2 a. Discuss the fall of potential method of measurement of earth resistance. **(04 Marks)**
   b. With the neat circuit diagram, describe the operation of Maxwell Wein Bridge. List its merits and demerits. **(06 Marks)**
   c. Discuss the method of determining capacitance and dissipation factor using how voltage Schering bridge. **(06 Marks)**

Module-2

3 a. Discuss the errors and their compensating techniques used in dynamometer type Wattmeter. **(05 Marks)**
   b. Discuss the constructional features and working principle of rotating type phase sequence indicator. **(06 Marks)**
   c. A three phase induction motor draws a power input at a voltage of 250V, 20A and 0.8 power factor lag. Find percentage error in Wattmeter reading if :
      i) Pressure coil is on supply side
      ii) Current coil is on supply side
      Assume current coil resistance and pressure coil resistance = 0.2 Ω and 5000Ω. **(05 Marks)**

OR

4 a. Discuss the construction and working principle of electrodynamometer type single phase power factor meter. **(06 Marks)**
   b. Explain the errors in a LPF wattmeter and give the adjustments done to compensate for the errors. **(05 Marks)**
   c. Explain the working principle of Weston frequency meter. **(05 Marks)**

Module-3

5 a. Discuss the procedure used to extend the range of DC ammeter and DC volt meter using shunts and multipliers. **(07 Marks)**

b. Describe the operation of a current transformer using a phasor diagram. Differentiate a current transformer from a potential transformer. **(09 Marks)**

OR

6 a. A moving coil instrument has a resistance of 5 Ohm and gives a full scale reading of 50mA. Calculate :
   i) The shunt resistance required to increase the range to 200A
   ii) The series resistance required to use it as a voltmeter of range 0 – 750V
   iii) Power consumed in both the cases. **(09 Marks)**

b. Describe the operation of potential transformer using equivalent circuit and phasor diagram. **(07 Marks)**

Module-4

7 a. Using a block diagram schematic, explain the working of an electronic energy meter. List the drawbacks of traditional energy meter. **(08 Marks)**

b. With a neat sketch explain the working of the following :
   i) True rms reading voltmeter
   ii) Q meter. **(08 Marks)**

OR

8 a. With neat sketch, explain the working of the following :
   i) Integrating type DVM
   ii) Ramp type DVM. **(08 Marks)**

b. Explain the working of electronic multimeter. **(08 Marks)**

Module-5

9 a. With a neat sketch explain the working of cathode ray tube. **(08 Marks)**

b. With a neat sketch explain the working of the following :
   i) LED display
   ii) LCD display. **(08 Marks)**

OR

10 a. With appropriate sketch explain the working of strip chart recorder. **(08 Marks)**

b. Write short notes on the following :
   i) X – Y recorders
   ii) LVDT type recorder. **(08 Marks)**

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